What is claimed is:

1. A linear actuator, comprising:

a stator having a coil wound around an end portion of a rail-shaped magnetic substance; and

a mover which faces a rail-shaped portion of said stator, relatively moves along the rail-shaped portion, and includes a magnetic substance, wherein

an electric current flows through the coil to centrally produce magnetic flux on the rail-shaped portion facing said stator, thereby obtaining magnetic thrust of said mover.

2. A first component which is formed by rail-shaped magnetic pieces in substantially parallel rows, each of which has a coil wound around at an end portion of a longitudinal direction of the piece and makes a periodical magnetic change along the longitudinal direction of the piece by flowing an electric current through the coil; and

a second component facing said first component at predetermined spacing, and having N and S magnetic poles along the longitudinal direction of the plurality of pieces, wherein

said second component can be moved relative to

said first component along the longitudinal direction of said first component by differentiating distribution of magnetic changes of the plurality of pieces of said first components on a surface facing said second component.

3. A linear actuator, comprising:

a stator having K (K indicates and integer equal to or larger than 2) stator piece pairs, and each stator piece pair is composed of two stator pieces which are parallel-placed rail-shaped magnetic substances having a plurality of projections arranged at regular spacing T in a longitudinal direction, a bridge made by magnetic substance connecting one end of each stator piece together magnetically, and a coil wound around the bridge to magnetize the two stator pieces for opposite polarities; and

a mover having K mover piece pairs, and each mover piece pair is composed of magnetically-connected two mover pieces which are faced at predetermined spacing to said two stator pieces one to one which comprise said stator piece pair, and each mover piece has a magnetic core and magnetic poles formed on a portion of the magnetic core facing to said stator piece and arranged such that all or part of the N poles face to projections

of the stator piece when all or part of the S poles face to slots between the projections, wherein:

in each of K sets of one stator piece pair and one mover piece pair facing to each other,

two sets of a stator piece and a mover piece facing to each other are arranged such that positions of the magnetic poles on the mover piece to the projections on the stator piece in one set are shifted relative to those of the other set by T/2 in the longitudinal direction of said stator;

with the K sets of one stator piece pair and one mover piece pair, the positions of the magnetic poles on the mover pieces to the projections on the stator pieces are sequentially shifted relative to each other at regular spacing along the longitudinal direction of said stator; and

thrust along the longitudinal direction of said stator can be produced on said mover by sequentially applying an electric current to a coil of each stator piece pair in a time series.

4. The linear actuator according to claim 3, wherein:

said stator piece pair is formed such that the projections of its two stator pieces face to each other; and

said mover piece pair is provided between the two stator pieces in the stator piece pair corresponding to the mover piece pair.

5. A linear actuator, comprising:

a stator having M (M indicates an integer equal to or larger than 3) stator pieces, each of which is formed by a rail-shaped magnetic substance having a plurality of projections arranged at regular spacing in a longitudinal direction, and which are arranged parallel to each other, with one end of the stator pieces magnetically connected, and with a coil situated to each of the stator pieces to magnetize the projections; and

a mover having M mover pieces, which are faced at predetermined spacing to said stator pieces one to one, and each mover piece has a magnetic core, which is magnetically-connected to the cores of adjacent mover pieces, and magnetic poles formed on a portion of the magnetic core facing to said stator piece and arranged such that all or part of the N poles face to projections of the stator piece when all or part of the S poles face to slots between the projections, wherein:

with M sets of one stator piece and one mover piece facing to each other, the positions of the magnetic poles on the mover pieces to the projections on the stator

pieces are sequentially shifted relative to each other at regular spacing along the longitudinal direction of said stator; and

thrust along the longitudinal direction of said stator can be produced on said mover by sequentially applying an electric current to a coil of each stator piece in a time series.

6. The linear actuator according to claim 3, wherein said mover piece is configured by closely coupling a core of a strong magnetic substance with a permanent magnet as a magnetic pole.

7. The linear actuator according to claim 4, wherein said mover piece is configured by closely coupling a core of a strong magnetic substance with a permanent magnet as a magnetic pole.

8. The linear actuator according to claim 5, wherein said mover piece is configured by closely coupling a core of a strong magnetic substance with a permanent magnet as a magnetic pole.

9. The linear actuator according to claim 3, wherein said bridge to connect the stator pieces

magnetically and said coils are also provided at the other end of the stator.

10. The linear actuator according to claim 4, wherein said bridge to connect the stator pieces magnetically and said coils are also provided at the other end of the stator.

11. The linear actuator according to claim 5, wherein said bridge to connect the stator pieces magnetically and said coils are also provided at the other end of the stator.

12. The linear actuator according to claim 6, wherein said bridge to connect the stator pieces magnetically and said coils are also provided at the other end of the stator.

13. The linear actuator according to claim 3, wherein a sensor coil is wound in a slot between the projections of said stator pieces, and an absolute position of said mover can be detected based on a change of inductance of the sensor coil made when said mover passes over the sensor coil.

14. The linear actuator according to claim 4, wherein a sensor coil is wound in a slot between the projections of said stator pieces, and an absolute position of said mover can be detected based on a change of inductance of the sensor coil made when said mover passes over the sensor coil.

15. The linear actuator according to claim 5, wherein a sensor coil is wound in a slot between the projections of said stator pieces, and an absolute position of said mover can be detected based on a change of inductance of the sensor coil made when said mover passes over the sensor coil.

16. The linear actuator according to claim 6, wherein a sensor coil is wound in a slot between the projections of said stator pieces, and an absolute position of said mover can be detected based on a change of inductance of the sensor coil made when said mover passes over the sensor coil.

17. The linear actuator according to claim 9, wherein a sensor coil is wound in a slot between the projections of said stator pieces, and an absolute position of said mover can be detected based on a change

of inductance of the sensor coil made when said mover passes over the sensor coil.

18. The linear actuator according to claim 13, wherein said sensor coil is configured by a part of a coil for driving said mover wound around the bridge of said stator.

19. The linear actuator according to claim 14, wherein said sensor coil is configured by a part of a coil for driving said mover wound around the bridge of said stator.

20. The linear actuator according to claim 15, wherein said sensor coil is configured by a part of a coil for driving said mover wound around the bridge of said stator.

21. The linear actuator according to claim 16, wherein said sensor coil is configured by a part of a coil for driving said mover wound around the bridge of said stator.

22. The linear actuator according to claim 17, wherein said sensor coil is configured by a part of a coil

for driving said mover wound around the bridge of said stator.